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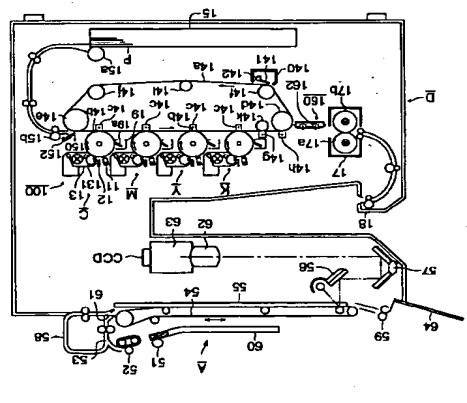
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(54) 発明の名称 カラー画像形成装置

(57) 要約
【課題】 画面上にカラートナー像を保持した転写材を一括定着するタンデム型カラー画像形成装置において、表裏のカラー画像の色味に差のない良好な画質を得ること。

【解決手段】 像形成体である各色毎の感光体ドラム10(C、Y、M、K)上に形成されたトナー像を順次重ね合わせるカラー画像形成装置において、中間転写体であるトナー像受像体14aを介して転写材である記録紙Pの裏面にトナー像を形成するとともに、シアン、イエロー、マゼンタ、黒からなるカラートナー像の重ね合わせ順が、最初と最後がシアンと黒、その間がイエローとマゼンタであることを特徴とする。



【特許請求の範囲】

【請求項1】 像形成体上に形成されたトナー像を順次重ね合わせてカラー画像を形成するカラー画像形成装置において、中間転写体を介して転写材の画面上にトナー像を形成するとともに、イエロー、マゼンタ、シアン、黒からなるカラートナー像の重ね合わせ順が、最初と最後がシアンと黒、その間がイエローとマゼンタであることを特徴とするカラー画像形成装置。

【請求項2】 前記最後のトナー像が黒であることを特徴とするカラー画像形成装置。

【請求項3】 前記転写材の裏面に形成される表面画像であるか又は前記転写材の裏面に形成される裏面画像であるかによって、その色補正を変更することを特徴とする請求項1又は2に記載のカラー画像形成装置。

【請求項4】 前記黒のトナー像が下層になるときのトナー付着量は、前記黒のトナー像が上層になるときのトナー付着量に比べて大にすることを特徴とする請求項3に記載のカラー画像形成装置。

【発明の詳細な説明】

【0001】
【発明の属する技術分野】 本発明は、周辺に各色毎の帯電手段と画像露光手段と現像手段とクリーニング装置とを備えた像形成体の4組を中間転写体上に配置して、上記像形成体上に形成したトナー像を転写材上に転写、定着する複写機、プリンタ、FAX等の電子写真方式のカラー画像形成装置に関し、特に転写材の画面上にカラー画像を形成することができるカラー画像形成装置に関する。

【0002】

【従来の技術】 従来、転写材搬送の信頼性が高く、転写材のジヤムや転写材のしわ等を引き起こすことのない両面画像形成装置として、特公昭49-37583号公報、同54-28740号公報、特開平1-44457号公報、同4-214576号公報等により、像形成体と中間転写体とを用いて転写材の画面上にトナー像を形成したと、1回の定着で両面画像を得る画像形成装置が提案されている。

【0003】 また本願発明者らは、像形成体の周りに、帯電手段、画像露光手段、現像手段等よりなるトナー像形成手段を複数組配置し、像形成体上に形成した重ね合わせカラートナー像を一旦ベルト状の中間転写体に一括して転写したのち、再度像形成体上に重ね合わせカラートナー像を形成し、像形成体上のトナー像及び中間転写体上のトナー像とタイミングを合わせて給送され、中間転写体により搬送される転写材の画面上にそれぞれ、像形成体上のトナー像を裏面画像として一括転写し、また中間転写体上のトナー像を表面画像として一括転写したのち、中間転写体から転写材を分離し、転写材上のトナー像を定着して両面カラー画像を形成する画像形成装置

や画像形成方法を特開平9-258492号公報や特開平9-258516号公報にて開示した。

【0004】 さらに、ベルト状の中間転写体に対して、各色毎の像形成体、帯電手段、画像露光手段、現像手段等よりなるトナー像形成手段を複数組配置し、上記各色毎の像形成体上に形成したカラートナー像と一旦ベルト状の中間転写体上に重ね合わせ転写して重ね合わせカラートナー像を形成したのち、上記重ね合わせカラートナー像とタイミングを合わせて給送され、中間転写体上のトナー像とタイミングを合わせて給送され、中間転写体上に形成したトナー像を裏面画像として転写材の裏面に一括転写したのち、中間転写体から転写材を分離し、転写材上のトナー像を定着して両面カラー画像形成装置にする、いわゆるタンデム型の両面カラー画像形成装置についても提案している。

【0005】

【発明が解決しようとする課題】 かかるタンデム型の画像形成装置においては、画像形成速度が早くなるという利点があるが、各色のトナー像形成順序が一定に決まっていて変更することはできない。従って、転写材に転写された重ね合わせトナー像の表面画像と裏面画像とは、その重ね順が反転し、このため表面画像と裏面画像とは、カラー画像の色調が違ってしまうという問題があった。

【0006】 本発明は上記の問題点を解決し、表裏のカラー画像の色調に差のない良好な画質の画像を得ることのできるカラー画像形成装置を提供することを目的とする。

【0007】

【課題を解決するための手段】 上記目的は、像形成体上に形成されたトナー像を順次重ね合わせてカラー画像を形成するカラー画像形成装置において、中間転写体を介して転写材の画面上にトナー像を形成するとともに、イエロー、マゼンタ、シアン、黒からなるカラートナー像の重ね合わせ順が、最初と最後がシアンと黒、その間がイエローとマゼンタであることを特徴とするカラー画像形成装置によって達成される。

【0008】 なお、前記最後のトナー像が黒であることを特徴とする前記カラー画像形成装置。また、前記トナー像は表面画像であるか又は裏面画像であるかによって、その色補正を変更することを特徴とする前記カラー画像形成装置。さらに、前記黒のトナー像が下層になるときのトナー付着量は前記黒のトナー像が上層になるときのトナー付着量に比べて大にすることを特徴とする前記カラー画像形成装置は好ましい実施態様である。

【0009】

【発明の実施の形態】 本発明の実施の形態の一例である

る静電層像が形成される。

【0039】前記の静電層像はCの現像器13により接触または非接触状態で反転形成され、Cの感光体ドラム10上にはその反転に応じてシアン(C)のトナー像が形成される。

【0040】上記の画像形成プロセスによってCの感光体ドラム10上に形成された裏面画像となるCのトナー像がCの転写域14bにおいて、Cの転写器14cによってトナー像受像体14a上に転写される。

10 【0041】次に、セータ(S)の画像形成ユニット100のMの感光体ドラム10は、Mのスクロットリフ電器11の帯電作用により電位が付与され、トナー像受像体14a上のCのトナー像と同期が取られ、Mの露光光学系12によって第2の色番号すなわちMの画像データに対応する電気信号による画像露光(露光)が行われ、Mの現像器13による接触又は非接触の反転現象によって裏面画像となるセータ(S)のトナー像が形成される。このMのトナー像は、Mの転写域14bにおいてMの転写器14cによってトナー像受像体14a上に転写され、前記シアン(C)のトナー像の上からMのトナー像が重ね合わされて形成される。

【0042】同様のプロセスにより、前記C、Mの重ね合わせトナー像と同期が取られ、イエロー(Y)の画像形成ユニット100によりYの感光体ドラム10上に形成された、第3の色番号によるYの画像データに対応する裏面画像となるYのトナー像が、Yの転写域14bにおいて、Yの転写器14cによって、前記C、Mの重ね合わせトナー像の上からYのトナー像が重ね合わされて形成され、さらに、そのC、M、Yの重ね合わせトナー像と同期が取られ、黒(K)の画像形成ユニット100によりKの感光体ドラム10上に形成された第4の色番号によるKの画像データに対応する裏面画像となるKのトナー像が、Kの転写域14bにおいて、Kの転写器14cによって、前記C、M、Yのトナー像の上からKのトナー像が重ね合わされて形成され、トナー像受像体14a上に裏面画像のC、M、Y及びKの4色の重ね合わせカラートナー像が形成される(図2(A))。

【0043】転写後の各色毎の感光体ドラム10の画面上に残ったトナーは、感光体ドラムクリーニング手段であるクリーニング装置19に至り、感光体ドラム10に当接したゴム材から成るクリーニングブレード19aによってクリーニングされる。

【0044】以上のようにしてトナー像受像体14a上に裏面画像となる重ね合わせたカラートナー像が形成されたのち、引き置きトナー像受像体14aに保持されている裏面画像のカラートナー像と同期が取られて、Cの画像形成ユニット100によりCの表面画像となるCのトナー像が前記のカラー画像形成プロセスと同様にCの感光体ドラム10上に形成される。この際、Cの感光体ドラム10上に形成されるCの表面画像は、前記

Cの感光体ドラム10上に形成した裏面画像に対して被像となるように画像データが変更される。

【0045】Cの感光体ドラム10上のCの表面画像像形成にもなっている転写材である転写紙Pが転写材取納手段である給紙カセット15より、送り出しローラ15aにより送り出され、転写材給送手段としてのタイミングローラ15bへ搬送され、タイミングローラ15bの駆動によって、Cの感光体ドラム10上に保持されたCの表面画像のトナー像と、トナー像受像体14aに保持されている裏面画像のカラートナー像との同期がとられてCの転写域14bへ給送される。この際、転写紙Pに当接状態とされたトナー像と同極性(本実施形態においてはマイナス極性)の直流電圧が印加された先端がブラシ状の転写器150により、転写紙Pがトナーと同極性に帯電され、トナー像受像体14aに保持されたCの転写域14bへ搬送される(図2(B))。トナーと同極性に帯電が行うことにより、トナー像受像体14a上のトナー像やCの感光体ドラム10上のトナー像と引き合うことを防止して、トナー像の乱れを防止している。ブラシ状の転写器150に代わりコロナ帯電器を用いてもよい。

【0046】Cの転写域14bではトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加され、Cの転写器14cによってCの感光体ドラム10上の表面画像が転写紙Pの表面に転写される。このとき、トナー像受像体14a上の裏面画像は転写紙Pに転写されないでトナー像受像体14a上に存在する。

【0047】同様にして、トナー像受像体14aに保持されている裏面画像のカラートナー像とCの表面画像のトナー像との同期が取られ、M、Y、Kそれぞれの画像形成ユニット100によりM、Y、Kの表面画像のトナー像が感光体ドラム10上に形成され、M、Y、Kの表面画像のトナー像がM、Y、Kそれぞれの転写域14bでトナーと反対極性(本実施形態においてはプラス極性)の電圧が印加された転写器14cによって各感光体ドラム10上のM、Y、Kの表面画像のカラートナー像がM、Y、Kの順に転写紙Pの表面にCのトナー像の上に順次転写される。このとき、トナー像受像体14a上の裏面画像は転写紙Pに転写されないでトナー像受像体14a上に存在する。C、M、Y、Kの感光体ドラム10上に形成されるC、M、Y、Kの表面画像は、前記C、M、Y、Kの感光体ドラム10上に形成した裏面画像に対してそれぞれ被像となるように画像データは変更される。

【0048】表面にカラートナー像が転写された転写紙Pは、トナーと反対極性(本実施形態においてはプラス極性)の電圧を印加した裏面転写器14gへと搬送され、裏面転写器14gによりトナー像受像体14aの画面上の裏面画像のカラートナー像が一括して転写紙Pの裏面に転写される。

【0049】また、転写器150は転写紙Pの後端の通過の直前あるいは通過と同時にトナー像受像体14aより当接解除され転写紙Pと離開される(図2(C))。転写器150への電圧の印加は転写紙Pの送り出されているときのみであり、転写紙Pとの離開と同時に転写器150へ印加されている電圧は切断される。

【0050】画面上にカラートナー像が転写された転写紙Pは、次に転写ローラ14dの曲率分離あるいは必要に応じて曲率分離と併用して行われる転写材分離手段としての紙分離AC除電器14hの除電作用により、トナー像受像体14aから分離され、拍重162で受け取られた搬送部160を経て、定着装置17へと搬送される。定着装置17において、転写紙Pは定着ローラ17aと圧着ローラ17bとの間で熱と圧力とを加えられることにより転写紙Pの裏面のトナー像が定着され、画面上に転写紙Pがなされた転写紙Pは裏面の画像が反転して送られ、排紙ローラ18により装置外部のトレイへ排出される。

【0051】転写後のトナー像受像体14aの画面上に残ったトナーは、トナー像受像体14aを挟んでガイドローラ14iに対して設けられた、支軸142と回転駆動点としてトナー像受像体14aに当接及び当接解除可能なトナー像受像体14aに当接状態とされたトナー像受像体クリーニング装置140のトナー像受像体クリーニングブレード141によりクリーニングされる。

【0052】また、転写後の各色毎の感光体ドラム10の画面上に残ったトナーは、クリーニング装置19のクリーニングブレード19aにより残留トナーを除き、不図示の帯電器の帯電露光器により先の画像形成による感光体ドラム10上の残留が解消されて、次の画像形成サイクルにはいる。

【0053】上記の画面画像形成装置では、上記の装置で説明したような転写材の画面上に画像を形成する画面画像形成の他に、転写材の表面又は裏面のみの片面に画像を形成する片面画像形成もなされることは勿論である。

【0054】ここで、前記画像取部A、画像データ処理部B、画像形成部Dからなる上記のカラー画像形成装置の回路構成を、図3及び図4のブロック図に従って説明する。

【0055】まず、画像取部Aにおいて、前記の撮像素子CCDから出力される色分離した3色のアナログ画像信号は、A/D変換器B11によってディジタル画像信号(画像データ)に変換されて、インターフェイスB12を介して画像データ処理部Bに出力される。

【0056】画像データ処理部Bに出力されたディジタル画像信号(画像データ)は、まず、色変換B13によって適度情報に変換される。

【0057】そして、使用者の操作指定に従った変換処理が、拡大・縮小処理B14で行われる。また、画像判

別処理B15においては、前記濃度変換B13で変換された濃度情報に基づいて文字画・写真画の判別を行い、該判別結果に基づいてフィルタ処理B16におけるフィルタ特性を設定し、フィルタ処理B16では、前記設定に従って空間フィルタ処理を行う。

【0058】なお、前記画像判別処理B15が、本実施形態における画像判別手段及び処理特性変換手段に相当し、文字画・写真画の判別は文字画と写真画との存在画像における文字画像領域、写真画像領域の判別を含むものとする。

【0059】ここで、拡大・縮小の指定に応じて、リアルタイム処理と入れ換えて行わせるために、一対のデータセレクトバ17、B18が設けられている。前記リアルタイム処理と変換処理との入れ換えは、縮小処理時の画像に見られる黒点画のモアレを防止するために行われる。

【0060】一方、EE処理B19は、本スキヤン前のプリスキヤンで得られた画像情報から原稿画像の情報を得るために、ヒストグラムデータを得る。そして図示しない画像処理系のCPUは、前記ヒストグラムデータに基づいて適正な補正データを補正処理B20に提供し、折り目消しなどの領域加工を行う。

【0061】フィルタ処理・変換処理が施された画像データ（最終情報）は、前記補正処理B20で後述する画像形成装置B25の特性に応じた補正が施された画像データB21に出力される。前記画像領域処理B21では、原稿の有効画像領域の抽出、枠消し、折り目消しなどの領域加工を行う。

【0062】上記のようにして画像形成に必要な全ての画像処理が施され、後述する画像形成装置B25への最終出力情報となった画像データ（濃度情報）は、インテーフエイスB22を介して画像形成部D1に出力される。

【0063】画像形成部D1においては、原稿の群取りに対してリアルタイムに感光体ドラム10上の画像形成を行う機構と共に、入力された画像データを画像記憶部B23において積載記憶保持しておき、該記憶された画像データを後から任意に群み出すデータセレクトバB9と、第2画に対して画像補正を行う画像補正処理B92と、補正された画像データより画像形成を行わせる機能を有している。

【0064】ここで、本実施形態では、上記のように原稿画像を群み取って得られ、然も、必要な画像が全て記憶された画像データを保存しておき、該記憶された画像データを後から選択的に群み出して画像形成を行わせる機能を電子RDH機能と称するものとする。

【0065】画像形成部D1には、レーザプリンタなどである画像形成装置B25の他に、前記電子RDH機能を実現するための、画像データを書き換え可能に記憶する画像記憶部B23（画像データ記憶手段）が設けられる一方、前記電子RDH機能と通常のリアルタイム画像形成

いられる。この色補正のためのマスキング用のパラメータは表面像と裏面画像に対してそれぞれの予め設定しておき、表面像と裏面像に応じてパラメータの設定変更が行われる。このような色処理と変換及びフィルタ処理が色処理B921と変換及びフィルタ処理B922において行われ、スクリーン角、ディザや陰差拡散等の多値化処理B923を経て、画像形成装置B25のC、M、Y、K各色の露光光学系12への出力が行われる。このような画像補正処理が画像補正処理部B92において行われる。表面像と裏面像が揃った両面画像の形成が行われる。裏面画像は2回の転写工程を行うことにより、裏面画像に対して高くなり易く、解像度も低下し、これを補正する機能をも有する。

【0072】また、モノクロ画像の場合は色補正は不要であるし、裏面画像に対してのみ補正、フィルタ処理と濃度補正を行えばよく、黒（K）の最大濃度が飽和画像メータの設定変更を行えば黒（K）の最大濃度が飽和画像メータの最大濃度であることとなる。

【0073】また、前記説明においては画像データの濃度補正処理はデータセレクトバB91において行う構成となっているが、鏡像変換処理を画像補正処理B92における表面像と裏面像にそれぞれに設定変更するパラメータの中に含めた回路構成とすることも可能である。

【0074】前述のように、カラー画像形成時にはシアン（C）、マゼンタ（M）、イエロー（Y）の3色のトナーの他に黒（K）トナーを加えるのが一般である。これは高濃度部での濃度補正によりシャドー部での再現性を向上し、カラートナーの消費量を減らし、少量の黒（Y）トナーを加えることで色の耐久性を高め、文字等の再現性を向上させるからである。3色トナーからグレースケール、又はUCRと呼ぶ、通常UCRとしては100%以下が用いられる。

【0075】シアン（C）トナーが最上層になり、黒（K）トナーが最下層になる場合はKトナーはMトナー、YトナーあるいはCトナーに置換される。黒（K）トナーが最上層になる場合に比べて見ることになる。従って、黒（K）トナーが最下層になる場合には黒（K）のトナー付着量を大きくする。又はUCR（下色除去）を大きくする調整が行われる。

【0076】画像形成の色の順性はC、M、Y、Kの順に行われる。ただし、この順性は上記の他にK、Y、M、C、C、Y、M、KあるいはK、M、Y、Cと、要

するに最初と最後がシアン（C）と黒（K）、その間がイエロー（Y）とマゼンタ（M）であればよい。

【0077】頻度の高い黒（K）単色モノクロプリントのことを考えるとKの画像形成ユニット100はトナー像受像体14aの搬送方向の最下流に配置するのがプリント速度が早くなるので好ましい。

【0078】

【発明の効果】本発明によるときは、両面にカラートナー像を保持した転写材を一括定着するタンデム型カラー画像形成装置において、装置のカラー画像の色調に差のない極めて良好な画質を得ることの可能なカラー画像形成装置が提供されることとなった。また、請求項2による体14aの搬送方向の最下流に配置されるので単色黒プリント時のプリント速度を早くする効果が生じる。

【図面の簡単な説明】

【図1】本発明の画像形成装置の一例を示す断面構成図である。

【図2】トナー像形成状態と転写材の供給を示す説明図である。

【図3】本発明に用いられる回路の一例を示すブロック図である。

【図4】図3の画像補正処理の詳細を示すブロック図である。

【図5】転写材の搬送における各色トナーの重なり順を示す説明図である。

【図6】実用されるカラートナーそれぞれの分光反射率曲線を示すグラフである。

【図7】理想的なカラートナーそれぞれの分光反射率曲線を示すグラフである。

【符号の説明】

10 感光体ドラム（像形成体）

11 スコトロム帯電器

12 露光光学系

13 現像器

14a トナー像受像体（中間転写体）

14c 転写器

14g 裏面転写器

14h 紙分離AC線電器

17 定着装置

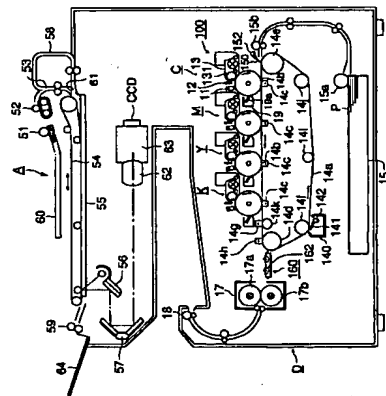
A 画像群取り部

B 画像データ処理部

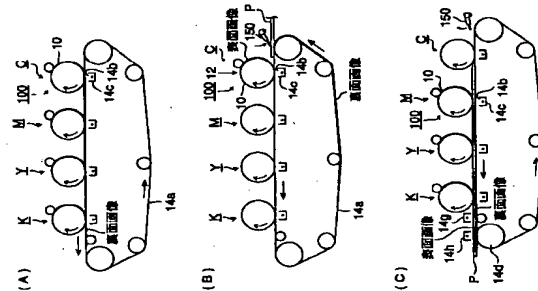
D 画像形成部

P 記録紙（転写材）

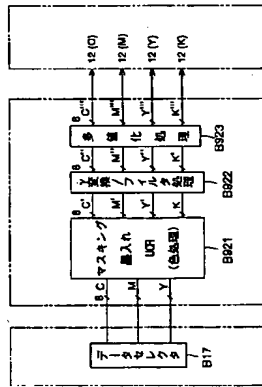
【図1】



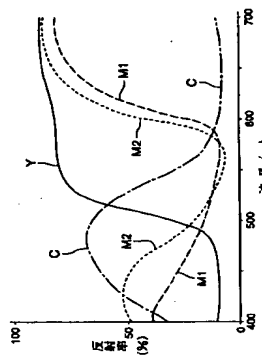
【図2】



【図4】



【図6】



PATENT ABSTRACTS OF JAPAN

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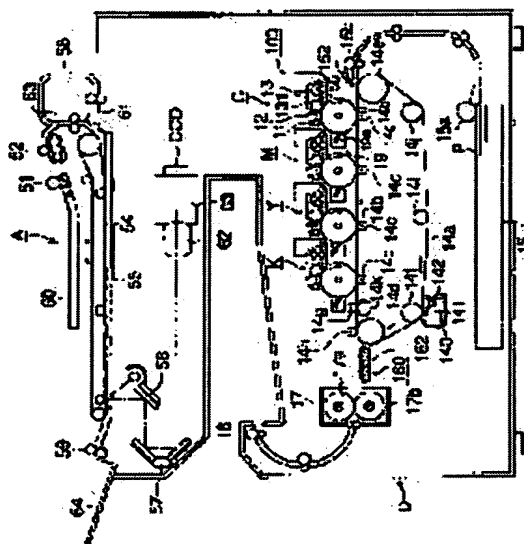
(72)Inventor : HANEDA SATORU

(54) COLOR IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain high image quality free from a tone difference between color images formed on front and rear sides, as for a tandem color image forming device for fixing a transfer material with color toner images on both sides in a mass.

SOLUTION: As for the color image forming device for sequentially superposing toner images respectively formed on photosensitive drums 10 for respective colors (C, Y, M and K) functioning as an image forming body, the toner image is formed on the rear side of a recording paper P as a transfer material via a toner image receptor 14a as an intermediate transfer body, and also, as for the order of superposing color toner images, that is, cyan, yellow, magenta and black toner images, the cyan image is the first order and the black image is the last order, and the yellow image and the magenta image come between them in order.



LEGAL STATUS

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[Date of final disposal for application]

[Patent number]

[Date of registration]

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of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

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JAPANESE

[JP,2002-031933,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] Color picture formation equipment with which the beginning and the last are characterized by for the order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black to be [for cyanogen, black, and the meantime] yellow and a Magenta in the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture while forming a toner image in both sides of imprint material through a middle imprint object.

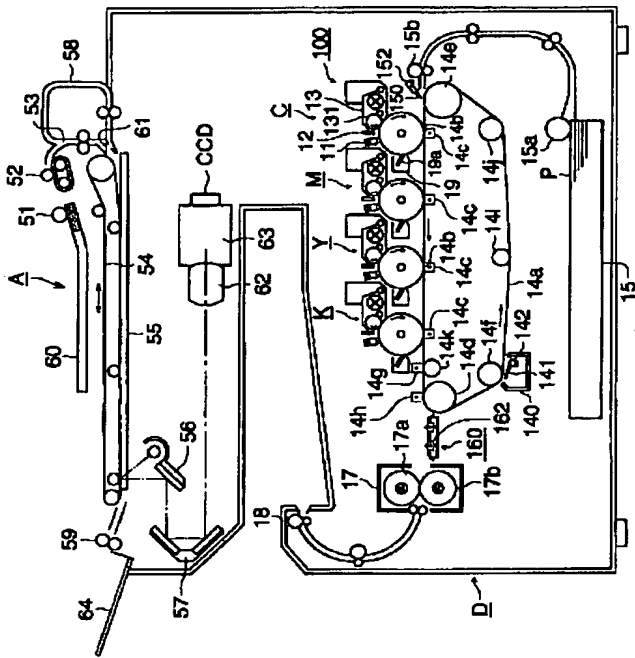
[Claim 2] Color picture formation equipment according to claim 1 characterized by the toner image of the aforementioned last being black.

[Claim 3] It is color picture formation equipment according to claim 1 or 2 characterized by changing the color correction by whether the aforementioned toner image is a surface picture formed in the front face of the aforementioned imprint material, or it is the rear-face picture formed in the rear face of the aforementioned imprint material.

[Claim 4] Toner coating weight in case the toner image of the aforementioned black becomes a lower layer is color picture formation equipment according to claim 3 characterized by making it size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer.

[Translation done.]

Drawing selection [Representative drawing]



[Translation done.]

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JAPANESE [JP,2002-031933,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention arranges 4 sets of the image-formation object equipped with the electrification means, the picture write-in means, the development means, and the cleaning equipment for every color on the outskirts on a middle imprint object, and relates to the color-picture formation equipment which can form a color picture especially in both sides of imprint material about the color-picture formation equipment of electrophotography methods, such as the copying machine which imprints the toner image formed on the above-mentioned image-formation object on imprint material, and is established, a printer, and FAX.

[0002]

[Description of the Prior Art] Conventionally, the reliability of imprint material conveyance is high and the image formation equipment which acquires a double-sided picture by one fixing with JP,49-37583,B, a 54-28740 official report, JP,1-44457,A, a 4-214576 official report, etc. after forming a toner image in both sides of imprint material, using an image formation object and a middle imprint object as double-sided image formation equipment which causes neither the jam of imprint material nor the wrinkling of imprint material is proposed.

[0003] Invention-in-this-application persons around an image formation object Moreover, an electrification means, a picture write-in means, Once [which has arranged two or more sets of toner image formation meanses which consist of a development means etc., and was formed on the image formation object] piling up and imprinting a color toner image collectively on a belt-like middle imprint object, Pile up on an image formation object again and form a color toner image, and double the toner image on an image formation object and the toner image on a middle imprint object, and timing, and it is fed. A package imprint is carried out using the toner image on an image formation object as a surface picture at both sides of the imprint material conveyed with a middle imprint object, respectively. Moreover, by making the toner image on a middle imprint object into a rear-face picture, after carrying out a package imprint, imprint material is separated from a middle imprint object. Image formation equipment and the image formation method which are established in the toner image on imprint material, and form a double-sided color picture were indicated in JP,9-258492,A or JP,9-258516,A.

[0004] A belt-like middle imprint object is countered. Furthermore, the image formation object for every color, an electrification means, Two or more sets of toner image formation meanses which consist of a picture write-in means, a development means, etc. are arranged. After once piling up, imprinting and laying the color toner image formed on the image formation object for every above-mentioned color on top of a belt-like middle imprint object and forming a color toner image, Double timing with the above-mentioned superposition color toner image, and a color toner image is again formed on the image formation object for every color. In the front face of the imprint material with which doubles the toner image and timing on a middle imprint

object, and it is fed and which is conveyed with a middle imprint object Pile up the toner image on the image formation object formed again as a surface picture, and it is imprinted. Moreover, after carrying out a package imprint at the rear face of imprint material by making the toner image on a middle imprint object into a rear-face picture, it has proposed also about the double-sided color picture formation equipment of the so-called tandem die which separates imprint material from a middle imprint object, is established in the toner image on imprint material, and obtains a double-sided color picture.

[0005]

[Problem(s) to be Solved by the Invention] In the image formation equipment of this tandem die, although there is an advantage that image formation speed becomes early, the toner image formation sequence for every color was decided uniformly, and it cannot change. Therefore, it piled up, and by the surface picture and rear-face picture of a toner image, the order of a pile was reversed and, for this reason, the surface picture and the rear-face picture had the trouble imprinted by imprint material that the color tone of a color picture will be different.

[0006] this invention solves the above-mentioned trouble and it aims at offering the color picture formation equipment which can acquire the picture of the good quality of image which does not have a difference in the color tone of the color picture of the front reverse side.

[0007]

[Means for Solving the Problem] In the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture, while the above-mentioned purpose forms a toner image in both sides of imprint material through a middle imprint object The order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black is attained for the beginning and the last by cyanogen, black, and the color picture formation equipment with which the meantime is characterized by being yellow and a Magenta.

[0008] In addition, the aforementioned color picture formation equipment characterized by the toner image of the aforementioned last being black. Moreover, it is the aforementioned color picture formation equipment characterized by changing the color correction by whether the aforementioned toner image is a surface picture or it is a rear-face picture. Furthermore, the aforementioned color picture formation equipment characterized by making toner coating weight in case the toner image of the aforementioned black becomes a lower layer into size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer is a desirable embodiment.

[0009]

[Embodiments of the Invention] The color picture formation equipment which was made to be fixed to both sides which are examples of the gestalt of operation of this invention by forming a color picture is explained. In addition, explanation of the gestalt of operation of the following this inventions does not show the best mode, and limits neither the technical range of a claim, nor a terminological meaning. Moreover, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image formation object in an imprint region is called rear face, and the picture which imprints the picture imprinted on the front face of imprint material at the rear face of a surface picture and imprint material is called rear-face picture.

[0010] The composition and the operation of color picture formation equipment of 1 operation gestalt in connection with this invention are explained using drawing 1 and drawing 2 . Drawing 1 is the cross-section block diagram of the color picture formation equipment in which 1 operation gestalt of the color picture formation equipment in connection with this invention is shown. drawing 2 It is drawing showing the toner image formation state of both sides of the color picture formation equipment in connection with this invention. drawing 2 (A) Drawing where drawing which imprints the toner image formed in the image formation object on a middle

imprint object, and forms a rear-face picture, and drawing 2 (B) form a surface picture in an image formation object synchronizing with the rear-face picture on a middle imprint object, and drawing 2 (C) are drawings showing the double-sided image formation to an imprint material top.

[0011] In drawing 1, the color picture formation equipment shown with this operation form consists of picture read station A, the image-data-processing section B (illustration abbreviation), and the image formation section D, the image-data-processing section B is equivalent to an image-processing means, and the aforementioned image formation section D is equivalent to an image formation means for the aforementioned picture read station A at a picture read means.

[0012] Picture read station A makes possible picture read recorded on both sides or one side (front face) of a manuscript, in picture read station A, the laminating of the manuscript 60 is carried out to the order of a page from the bottom by making a front face into facing up, it sells with the taking-out roller 51, and one manuscript 60 of the best layer is conveyed at a time towards the conveyance way 53 one by one by the operation of a roller 52.

[0013] It is made to evacuate to the position which eliminates the guide plate 61 energized by the position shown as a solid line, and is shown with a dashed line, and paper is fed to the taken-out manuscript 60 on the platen glass 55 of the transparent body through the conveyance belt 54, and it stops to a manuscript reading station in the state where the front face was placed upside down. A guide plate 61 returns to the position immediately shown as a solid line after a manuscript's 60 passing.

[0014] The surface picture of the manuscript 60 on platen glass 55 The 1st mirror unit 56 which consists of a lighting lamp which constitutes scanning optical system, and the 1st mirror, Reading operation by the speed V of the 1st mirror unit 56 of the 2nd mirror unit 57 which consists of the 2nd mirror located in the shape of V character, and the 3rd mirror, It is read by movement by speed $V / 2$ to this direction by the 2nd mirror unit 57, and image formation is carried out to the light-receiving side of the image pck-up element CCD which are three line sensors through the projection lens 62 and a dichroic prism 63. Photo electric translation of the optical image of the shape of a line which carried out color separation and which carried out image formation on the image pck-up element CCD is carried out to an electrical signal (luminance signal) one by one.

[0015] At picture read station A, after reading of a surface picture is completed, a manuscript 60 reverses the front reverse side through the reversal feeding way 58 by temporary inverse rotation of the conveyance belt 54, and paper is again fed to it on platen glass 55 through the conveyance belt 54 through the conveyance way 53, and it stops to a manuscript reading station in the state where the rear face was placed upside down.

[0016] With the aforementioned scanning optical system, the manuscript 60 on platen glass 55 is read, carries out color separation of the rear-face picture, and photo electric translation is carried out to an electrical signal by the image pck-up element CCD.

[0017] Paper is delivered to the manuscript 60 which ended reading of the picture on platen glass 55 so that a front face may be piled up in order of [bottom] a page in the upward state on a tray 64 through the delivery roller 59 by operation of the conveyance belt 54.

[0018] In the image-data-processing section B mentioned later, the picture signal (image data) of the manuscript picture read by the aforementioned picture read station A is outputted to the image formation section D, after various image processings, such as concentration conversion, filtering, variable power processing, gamma amendment, and amendment processing of a table / back picture, are performed.

[0019] The photo conductor drum whose 10 is an image formation object for every color in the image formation section D, The scorotron electrification machine whose 11 is an electrification means for every color, the exposure optical system whose 12 is a picture write-in means for every color, The development counter whose 13 is a development means for every color, the

toner image television object whose 14a is a middle imprint object, The imprint machine whose 14c is an imprint means for every color, the rear-face imprint machine whose 14g is a rear-face picture imprint means, The paper separation AC electric discharge machine whose 14h is an imprint material separation means, the timing roller whose 15b is an imprint material supply means, The paper electrification machine whose 150 is an imprint material electrification means, the conveyance section which is a conveyance means by which 160 has a spur 162, The fixing equipment whose 17 is a fixing means, the cleaning equipment whose 19 is an image formation object cleaning means for every color, and 140 are toner image television object cleaning equipment which is middle imprint object cleaning meanses.

[0020] In this operation gestalt the photo conductor drum 10 for every color, the scorotron electrification machine 11 for every color, the exposure optical system 12 for every color, and the development counter 13 for every color The image formation unit 100 is constituted as these 1 sets. Cyanogen (C), A Magenta (M), yellow (Y), and 4 sets of image formation units 100 for every black (K) color are formed, and it is arranged in order of C, M, Y, and K according to the color and sequence which are formed to the hand of cut of toner image television object 14a which rotates to the counterclockwise rotation shown by the arrow of drawing 1 . However, C, Y, M, K, and the beginnings, such as K, Y, M, C, or K, M, Y, C, and the last other than the above [this order of an array] should just be [cyanogen (C) black (K) and the meantime] yellow (Y) and a Magenta (M).

[0021] The photo conductor drum 10 which is an image formation object forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of drawing 1 where a conductive layer is grounded.

[0022] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means for every color performs the electrization (it sets in this operation gestalt and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0023] The exposure optical system 12 which is a picture write-in means for every color is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 for every color is a unit for exposure which consists of optical convergency optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light (picture write-in light) arranged by parallel at main scanning direction in the shape of an array. As exposure optical system 12, it is also possible to, use a laser beam study system in addition to this. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by picture read station A and memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color.

[0024] The development counter 13 which is a development means for every color maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5-1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15-25mm, and the developer of cyanogen (C), yellow (Y), a Magenta (M) and one black (K) component, or two components is held in the interior according to the development color for every color.

Un-illustrating dashes the development sleeve 131 of each development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100–500 micrometers, by the koro, is maintained at non-contact, by impressing the development bias voltage which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs contact or non-contact reversal development, and develops the aforementioned electrostatic latent image on the photo conductor drum 10 in a toner image.

[0025] A volume resistivity toner image television object 14a which is a middle imprint object 1012 – 1015 ohm-cm, Surface electrical resistance is the endless belt of the 1012 – 1015 ohm/cm 2. For example, a denaturation polyimide, A thermosetting polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, Distributed the electrical conducting material to engineering plastics, such as a nylon alloy. It is the seamless belt of the two-layer composition which performed fluorine coating with a thickness of 5–50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1–1.0mm as a toner filming prevention layer preferably. If it considers as the base of toner image television object 14a, a half-conductivity rubber belt with a thickness of 0.5–2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber.

[0026] Toner image television object 14a is inscribed in and laid [firmly] across drive roller 14d and follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of drawing 1. According to the hand of cut of toner image television object 14a, it is prepared in order of follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d, guide-idler 14f, tension roller 14i, and guide-idler 14j, and it can fix and rotate and tension roller 14i can move follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d and guide idlers 14f and 14j during rotation by the elasticity of toner image television object 14a.

[0027] If drive roller 14d rotates in response to a drive [drive motor / non-illustrated], drive rotation of the toner image television object 14a will be carried out. Follower rotation of follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and the tension roller 14i is carried out by rotation of toner image television object 14a. The belt slack of toner image television object 14a under rotation becomes it tense by tension roller 14i.

[0028] On both sides of toner image television object 14a, imprint machine 14c which is an imprint means for every color counters with the photo conductor drum 10 for every color, is prepared, and forms imprint region 14b for every color between toner image television object 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a toner image television object 14a top or the front face of imprint material.

[0029] Moreover, it is prepared in conductive rear-face imprint opposite roller 14k grounded on both sides of toner image television object 14a face to face, polar (it sets in this operation form and is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means bundles up the superposition color toner image supported on toner image television object 14a, and they imprint it at the rear face of imprint material.

[0030] Drive roller 14d is countered, 14h of paper separation AC electric discharge machines which are an imprint separation means counters with guide-idler 14f again, and the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means is formed.

[0031] The paper electrification machine 150 which is an imprint material electrification means is countered and formed in follower roller 14e grounded on both sides of toner image television object 14a, contact and contact release are possible for it to toner image television object 14a, is charged in imprint material, and is made to stick to toner image television object 14a by using

a pivot 152 as the rotation supporting point. In addition, the paper electrification machine 150 may be a corona discharge machine estranged and formed.

[0032] Conductive drive roller 14d grounded by the fixing equipment 17 side-edge section of toner image television object 14a on both sides of toner image television object 14a together with 14g of rear-face imprint machines if needed is countered, it is prepared, the alternating voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and 14h of paper separation AC electric-discharge machines discharges the imprint material conveyed by toner image television object 14a. Separation from toner image television object 14a of imprint material is performed to curvature separation of drive roller 14d, or curvature separation of drive roller 14d by using together an electric discharge operation of 14h of paper separation AC electric discharge machines.

[0033] The conveyance section 160 is formed between toner image television object 14a and fixing equipment 17, and a spur 162 is formed in the upper surface of the conveyance section 160. A spur 162 conveys the imprint material which has a toner image at the rear face to fixing equipment 17, preventing disorder of a rear-face toner image while dipping up the imprint material which is going to be conveyed by bending in the direction of toner image television object 14a, in case imprint material is separated from toner image television object 14a.

[0034] Fixing equipment 17 consists of two rollers of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, and is established in the toner image on imprint material by applying heat and a pressure between fixing roller 17a and sticking-by-pressure roller 17b.

[0035] On both sides of toner image television object 14a, the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means counters guide-idler 14f by the side of fixing equipment 17, is formed, and cleans the transfer residual toner on toner image television object 14a to toner image television object 14a by using a pivot 142 as the rotation supporting point by the toner image television object cleaning blade 141 in which contact and contact release are possible. It counters with guide-idler 14j by the side of penetration of imprint material, and toner image television object cleaning equipment 140 can also be prepared.

[0036] Next, a double-sided image formation process is explained. If the start of image recording is made, in picture read station A, the image data of the manuscript picture read by the image pck-up element or the image data of the picture edited by computer will be processed in the image-data-processing section B explained later as a picture signal according to each color of C (cyanogen), M (Magenta), Y (yellow), and K (black).

[0037] It rotates to the clockwise rotation which the photo conductor drum 10 of the image formation unit 100 of cyanogen (C) shows by the arrow of drawing 1 by starting of the photo conductor drive motor which is not illustrated by the start of image recording, and grant of potential is simultaneously started by the photo conductor drum 10 of C by electrification operation of the scorotron electrification machine 11 of C.

[0038] After potential is given to the photo conductor drum 10 of C, the picture writing (exposure) by the 1st chrominance signal about a rear-face picture, i.e., the electrical signal corresponding to the image data of C, is started by the exposure optical system 12 of C, and the electrostatic latent image corresponding to the picture of C of a manuscript picture is formed in the photosensitive layer of the front face of the photo conductor drum 10 of C.

[0039] Reversal development of the aforementioned latent image is carried out in the state of [non-contact] contact by the development counter 13 of C, and the toner image of cyanogen (C) is formed according to the rotation on the photo conductor drum 10 of C.

[0040] The toner image of C used as the rear-face picture formed on the photo conductor drum 10 of C of the above-mentioned image formation process is imprinted by imprint machine 14c of C on toner image television object 14a in imprint region 14b of C.

[0041] Subsequently, the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) Potential is given by electrification operation of the scorotron electrification

machine 11 of M, and the toner image of C on toner image television object 14a and a synchronization are taken. The picture writing (exposure) by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of M, is performed by the exposure optical system 12 of M, and the toner image of the Magenta (M) which serves as a rear-face picture by the contact or the non-contact reversal development by the development counter 13 of M is formed. The toner image of this M is imprinted by imprint machine 14c of M on toner image television object 14a in imprint region 14b of M, and the toner image of the upper shell M of the toner image of the aforementioned cyanogen (C) piles up, and is formed.

[0042] According to the same process, the superposition toner image of Above C and M and a synchronization are taken. The toner image of Y used as the rear-face picture corresponding to the image data of Y by the 3rd chrominance signal formed on the photo conductor drum 10 of Y of the image formation unit 100 of yellow (Y) sets to imprint region 14b of Y. Of imprint machine 14c of Y, the toner image of the upper shell Y of the superposition toner image of Above C and M piles up, and is formed. Furthermore, the toner image of K used as the rear-face picture corresponding to the image data of K by the 4th chrominance signal which the superposition toner image of C, M, and Y and synchronization were taken, and was formed on the photo conductor drum 10 of K of the black (K) image formation unit 100. In imprint region 14b of K, of imprint machine 14c of K, the toner image of the upper shell K of the toner image of Above C, M, and Y piles up, and is formed, and the superposition color toner image of four colors of C, M, Y, and K of a rear-face picture is formed on toner image television object 14a (drawing 2 (A)).

[0043] The toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint results in the cleaning equipment 19 which is a photo conductor drum cleaning means, and is cleaned by cleaning-blade 19a which consists of the rubber material which contacted the photo conductor drum 10.

[0044] After the piled-up color toner image which turns into a rear-face picture on toner image television object 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeeding supported by toner image television object 14a is taken, and the toner image of C which turns into a surface picture of C by the image formation unit 100 of C is formed on the photo conductor drum 10 of C like the aforementioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of C formed on the photo conductor drum 10 of C may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C.

[0045] In connection with the surface image formation of C to the photo conductor drum 10 top of C, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means. It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b. The synchronization with the toner image of the surface picture of C supported on the photo conductor drum 10 of C and the color toner image of the rear-face picture currently supported by toner image television object 14a is taken, and imprint region 14b of C is fed. Under the present circumstances, paper electrification of the recording paper P is carried out at a toner and like-pole nature, toner image television object 14a is adsorbed by the brush-like paper electrification machine 150, and the nose of cam where it is considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation form and is minus polarity) was impressed to the recording paper P is conveyed with it to imprint region 14b of C (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on toner image television object 14a, or the toner image on the photo conductor drum 10 of C, and disorder of a toner image is prevented. Instead of the brush-like paper electrification machine 150, you may use a corona-electrical-charging machine.

[0046] In imprint region 14b of C, the surface picture on the photo conductor drum 10 of C is imprinted by imprint machine 14c of C to which polar (it sets in this operation form and is plus

polarity) voltage opposite to a toner was impressed on the front face of the recording paper P. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting.

[0047] Similarly the synchronization with the color toner image of a rear-face picture and the toner image of the surface picture of C which are supported by toner image television object 14a is taken. The toner image of the surface picture of M, Y, and K is formed on the photo conductor drum 10 of each image formation unit 100. M, Y, and K -- the toner image of the surface picture of M, Y, and K -- M, Y, and K -- each imprint region 14b -- a toner and opposite polarity (in this operation form) The color toner image of the surface picture of M, Y, and K on each photo conductor drum 10 is imprinted one by one on the front face of the recording paper P in order of M, Y, and K by each imprint machine 14c to which the voltage of ** plus polarity was impressed at the toner image top of C. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting. Image data is changed so that the surface picture of C, M, Y, and K which are formed on the photo conductor drum 10 of C, M, Y, and K may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C, M, Y, and K, respectively.

[0048] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines which impressed polar (it sets in this operation gestalt and is plus polarity) voltage opposite to a toner, and the color toner image of the rear-face picture on the peripheral surface of toner image television object 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P.

[0049] Moreover, simultaneously with passage just before passage of the back end of the recording paper P, from toner image television object 14a, contact release is carried out and the paper electrification machine 150 is estranged with the recording paper P (drawing 2 (C)). Impression of the voltage to the paper electrification machine 15 is only a time of the recording paper P being sent, and the voltage currently impressed simultaneously with alienation with the recording paper P to the paper electrification machine 150 is disconnected.

[0050] The electric-discharge operation of 14h of paper separation AC electric-discharge machines as an imprint material separation means performed by next using together with curvature separation drive roller 14d if needed [curvature separation or if needed] dissociates from toner image television object 14a, and the recording paper P with which the color toner image was imprinted by both sides is conveyed through the conveyance section 160 in which the spur 162 was formed to fixing equipment 17. ***** to which the recording paper P applies heat and a pressure in fixing equipment 17 between fixing roller 17a and sticking-by-pressure roller 17b -- things are fixed to the toner image on the rear face of front of the recording paper P, the picture of the front reverse side is reversed and sent and the recording paper P with which double-sided image recording was made is discharged with the delivery roller 18 to the tray of the equipment exterior

[0051] The toner which remained on the peripheral surface of toner image television object 14a after an imprint uses as the rotation supporting point the pivot 142 which countered guide-idler 14f and was prepared on both sides of toner image television object 14a, and the contact and the contact release to toner image television object 14 a are possible for it, and it is cleaned by the toner image television object cleaning blade 141 of the toner image television object cleaning equipment 140 made into a contact state at toner image television object 14a.

[0052] Moreover, cleaning-blade 19a of cleaning equipment 19 removes a remains toner, the history on the photo conductor drum 10 by previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle.

[0053] Of course, also do single-sided image formation which forms a picture in one side of only the front face of imprint material, or a rear face other than the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation gestalt with above double-sided image formation equipment.

[0054] Here, the circuitry of the above color picture formation equipment which consists of aforementioned picture read station A, the image-data-processing section B, and the image formation section D is explained according to the block diagram of drawing 3 and drawing 4.

[0055] First, in picture read station A, the analog picture signal of three colors which are outputted from the aforementioned image pick-up element CCD and which carried out color separation is changed into a digital image signal (image data) by A/D converter B11, and is outputted to the image-data-processing section B through an interface B12.

[0056] The digital image signal (luminance signal) inputted into the image-data-processing section B is first changed into concentration information by the concentration conversion B13.

[0057] And variable power processing according to variable power specification of a user is performed by the enlarging-or-contracting processing B14. Moreover, in the picture distinction processing B15, character drawing and photograph drawing are distinguished based on the concentration information changed by the aforementioned concentration conversion B13, the filter shape in filtering B16 is set up based on this distinction result, and spatial filter processing is performed by filtering B16 according to the aforementioned setup.

[0058] In addition, the aforementioned picture distinction processing B15 shall be equivalent to the picture distinction means and processing property adjustable means in this operation form, and distinction of character drawing and photograph drawing shall include distinction of the character picture field in the mixture picture of character drawing and photograph drawing, and a photograph field.

[0059] Here, in order to replace filtering and variable power processing and to make them perform according to specification of enlarging or contracting, the data selectors B17 and B18 of a couple are formed. The exchange with the aforementioned filtering and variable power processing is performed in order to prevent the moire of the half-tone-dot drawing looked at by the picture at the time of reduction processing.

[0060] On the other hand, the EE processing B19 obtains histogram data, in order to acquire the feature of a manuscript picture from the image information obtained by the preece can in front of this scan. And CPU of the image-processing system which is not illustrated provides gamma amendment processing B20 with proper gamma amendment data based on the aforementioned histogram data.

[0061] The image data (concentration information) to which filtering and variable power processing were performed is outputted to the picture field processing B21, after gamma amendment according to the property of the image formation equipment B25 later mentioned by the aforementioned gamma amendment processing B20 is given. the aforementioned picture field processing B21 -- others [extraction / of the effective picture field of a manuscript] -- ****(ing) -- ***** (ing) -- etc. -- field processing is also performed

[0062] The image data (concentration information) which changed into the final output state to the image formation equipment B25 which all image processings required for image formation are performed as mentioned above, and is mentioned later is outputted to the image formation section D through an interface B22.

[0063] In the image formation section D, with the function to carry out image formation to the photo conductor drum 10 top to real time to the read of a manuscript The data selector B91 which reads the image data which carries out two or more storage maintenance of the inputted image data in the picture storage section B23, and was this memorized afterwards to arbitration, It has the picture amendment processing B92 in which picture amendment is performed corresponding to a table/reverse side, and the function to make image formation perform from the amended image data.

[0064] Here, with this operation form, the function to read alternatively from after the image data which a manuscript picture is read as mentioned above, it is obtained, and ** also saves the image data to which all required image processings were performed, and was this saved, and to make image formation perform shall be called an electronic RDH function.

[0065] In order to realize the aforementioned electronic RDH function other than the image formation equipment B25 which is a LASER beam printer etc. in the image formation section D, While the picture storage section B23 (image data storage means) memorized possible [rewriting of image data] is formed The data selector B91 for switching the aforementioned electronic RDH function and the usual real-time image formation function, and assigning the image data of a front face and a rear face and the picture amendment processing B92 in which picture amendment corresponding to a table/reverse side is performed are formed.

[0066] The aforementioned data selector B91 outputs alternatively the image data read from the picture storage section B23, or the image data serially outputted according to reading from the image-data-processing section B to image formation equipment (LASER beam printer) B25.

[0067] Namely, the image data from the image-data-processing section B which the image data of the same final output state as the time of making a real-time operation perform to usual is memorized, and is alternatively outputted by the aforementioned data selector B91, and the image data read from the picture storage section B23 are equally treated by the aforementioned picture storage section B23 in image formation equipment B25, and can perform image formation now in it.

[0068] With the image formation equipment of this invention, as for a rear-face picture, the imprint to a toner image television object from an image formation object and two imprints to imprint material from a toner image television object are performed. On the other hand, as for a surface picture, one imprint to imprint material from an image formation object is performed. When about 10% of toner coating weight falls at once on the occasion of these imprints, and performing an image processing on these conditions, compared with a surface picture, as for a rear-face picture, picture concentration becomes low. Moreover, gradation nature changes with the expulsion of the toner image by two imprints by the rear-face picture. Furthermore, by the color picture, a toner image laps, and since the sequence of doubling is reversed on imprint material as shown in drawing 5, a color tone changes with a front face and the rear face. Although the amount of UCR(s) is calculated from the mixing ratio of Y, M, and C3 color, since there is an inclination for K (black) used as the best layer to be emphasized too much if it is in a surface picture, the thing which the amount of UCR(s) is changed in a color reproduction, or like K component compared with a rear face and to abolish is needed by the surface picture and the rear-face picture.

[0069] Moreover, although the cyanogen (C) of the toner of a color developer, a Magenta (M), and the ideal spectral reflectance of yellow (Y) need to have the property shown in drawing 7, the spectral reflectance of an actual typical toner has a property as shown in drawing 6.

[0070] Especially a color-balance has a bad absorption property unnecessary to a green field, and a cyanogen (C) toner has lightness low close to black. Therefore, influence by the stacking-order foreword of a toner being reversed by the surface picture and rear-face picture at the time of double-sided image formation can be lessened by making it put on black (K), the beginning of four colors which pile up cyanogen (C), and the last.

[0071] As this operation form is shown in drawing 4, in the color processing B921 of the picture amendment processing B92, it is carried out including color processing of masking and inking, UCR, etc. in the masking section. In case alignment masking or the advanced color correction generally performed as masking is performed, nonlinear masking and masking which used the look-up table are used. Each sets up beforehand the parameter for masking for this color correction to the surface picture and the rear-face picture, and a setting change of a parameter is made according to a front face or a rear face. Such color processing, gamma conversion, and filtering are performed in the color processing B921, gamma conversion, and filtering B922, and

the output to C, M and Y of image formation equipment B25, and the exposure optical system 12 of K each color is performed through the multiple-value-ized processing B923 of a screen angle, a dither, error diffusion, etc. After such picture amendment processing is performed in the picture amendment processing section B92, formation of the double-sided picture in which picture concentration and the color tone were ready is performed. Since a rear-face picture performs 2 times of imprint processes, gamma tends to become high to a surface picture, and resolution also tends to fall. It also has an amendment function for this.

[0072] Moreover, if the black (K) maximum concentration is saturation picture concentration and a setting change of a parameter will be made only about gamma amendment and filtering that what is necessary is for the color correction to be unnecessary at the time of a monochrome picture, and to perform gamma amendment, and filtering and concentration amendment only to a rear-face picture, the double-sided picture the difference in the front reverse side is not accepted to be will be acquired.

[0073] Moreover, although mirror image transform processing of image data has composition performed in a data selector B91 in the aforementioned explanation, it is also possible to make mirror image transform processing into the circuitry included into the parameter which makes a setting change according to the front face or rear face in the picture amendment processing B92.

[0074] As mentioned above, it is general to add the black (K) toner other than the toner of three colors of cyanogen (C), a Magenta (M), and yellow (Y) to color picture formation. It is because this improves the repeatability in the shadow section by concentration supplement in the high concentration section, the consumption of a color toner is cut down, the endurance of a color is raised by adding a little black (Y) toner and repeatability, such as a character, is raised. The operation which takes and removes a gray component from 3 color toner, and is replaced with a black (K) toner is called lower color removal or UCR. Usually, 100% or less is used as UCR.

[0075] Since K toner is covered by M toner, Y toner, or C toner when a cyanogen (C) toner becomes the best layer and a black (K) toner becomes the lowest layer, compared with the case where a black (K) toner becomes the best layer, it will look palely. Therefore, when a black (K) toner becomes the lowest layer, adjustment which makes black (K) toner coating weight size, or enlarges UCR (lower color removal) is performed.

[0076] Sequence of the color of image formation is performed in order of C, M, Y, and K. However, in short, the beginning and the last other than the above [this sequence] should just be [cyanogen (C) black (K), and the meantime] yellow (Y) and a Magenta (M) with K, Y, M, C, C, Y, M, K, or K, M, Y and C.

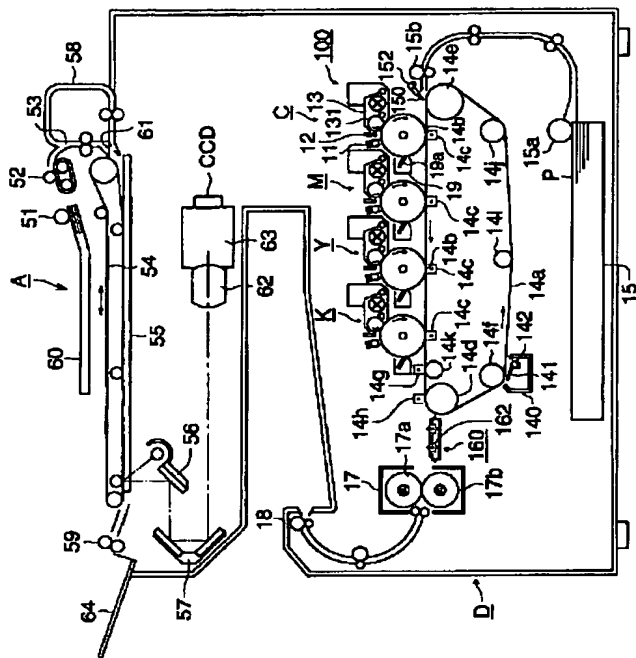
[0077] Since it becomes early to arrange in the style of [of the conveyance direction of toner image television object 14a] the lowest, its print speed is [the image formation unit 100 of K] desirable [considering the thing of (Black K) monochrome mode print with high frequency,].

[0078]

[Effect of the Invention] When based on this invention, in the tandem-die color picture formation equipment which carries out package fixing of the imprint material which held the color toner image to both sides, the possible color picture formation equipment of obtaining the very good quality of image which does not have a difference in the color tone of the color picture of the front reverse side will be offered. Moreover, when based on a claim 2, since the image formation unit 100 of K is arranged in the style of [of the conveyance direction of toner image television object 14a] the lowest, the effect which carries out print speed at the time of a monochrome black print early produces it.

[Translation done.]

Drawing selection [Representative drawing]



[Translation done.]

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JAPANESE [JP,2002-031933,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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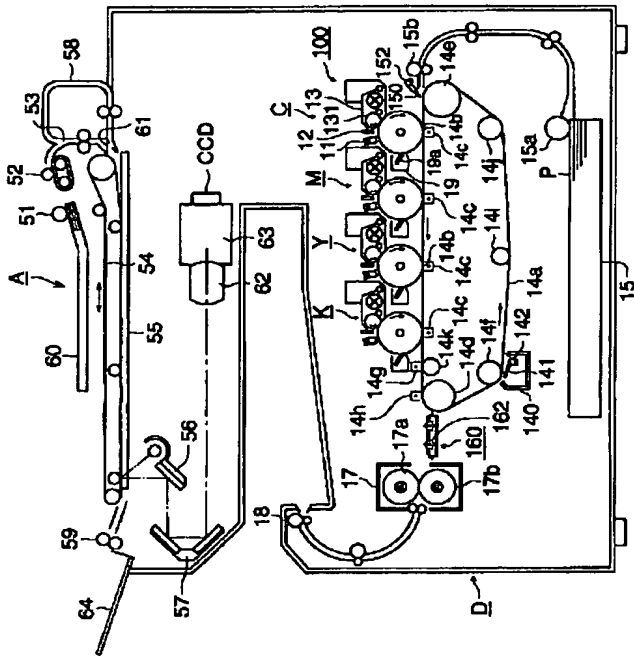
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TECHNICAL FIELD

[The technical field to which invention belongs] this invention arranges 4 sets of the image formation object equipped with the electrification means, the picture write-in means, the development means, and cleaning equipment for every color on the outskirts on a middle imprint object. It is related with the color picture formation equipment which can form a color picture especially in both sides of imprint material about the color picture formation equipment of electrophotography methods, such as a copying machine which imprints the toner image formed on the above-mentioned image formation object on imprint material, and is established, a printer, and FAX.

[Translation done.]

Drawing selection [Representative drawing] 



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PRIOR ART

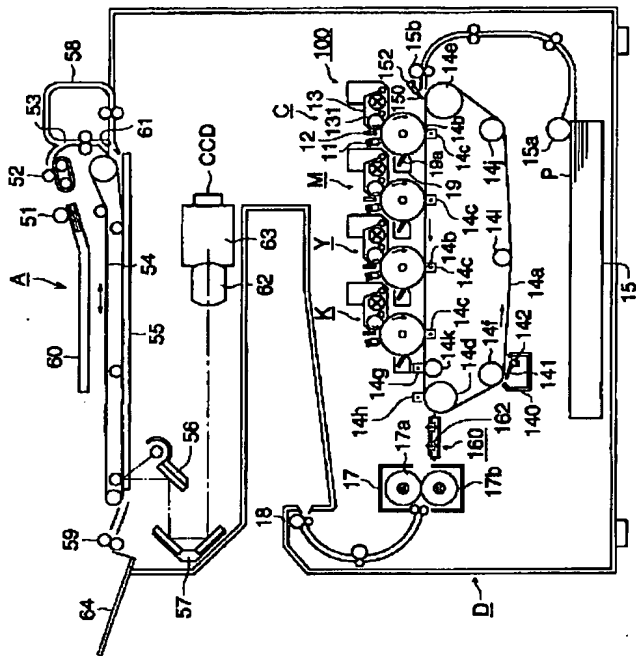
[Description of the Prior Art] As the double-sided image formation equipment which the reliability of imprint material conveyance is high and causes neither the jam of imprint material, nor the wrinkling of imprint material conventionally The image formation equipment which acquires a double-sided picture by one fixing with JP,49-37583,B, a 54-28740 official report, JP,1-44457,A, a 4-214576 official report, etc. after forming a toner image in both sides of imprint material using an image formation object and a middle imprint object is proposed.

[0003] Moreover, invention-in-this-application persons are an electrification means and a picture write-in means to the surroundings of an image formation object. Once [which has arranged two or more sets of toner image formation meanses which consist of a development means etc., and was formed on the image formation object] piling up and imprinting a color toner image collectively on a belt-like middle imprint object, Pile up on an image formation object again and form a color toner image, and double the toner image on an image formation object and the toner image on a middle imprint object, and timing, and it is fed. A package imprint is carried out using the toner image on an image formation object as a surface picture at both sides of the imprint material conveyed with a middle imprint object, respectively. Moreover, by making the toner image on a middle imprint object into a rear-face picture, after carrying out a package imprint, imprint material is separated from a middle imprint object. Image formation equipment and the image formation method which are established in the toner image on imprint material, and form a double-sided color picture were indicated in JP,9-258492,A or JP,9-258516,A.

[0004] A belt-like middle imprint object is countered. Furthermore, the image formation object for every color, an electrification means, Two or more sets of toner image formation meanses which consist of a picture write-in means, a development means, etc. are arranged. After once piling up, imprinting and laying the color toner image formed on the image formation object for every above-mentioned color on top of a belt-like middle imprint object and forming a color toner image, Timing is doubled with the above-mentioned superposition color toner image, and a color toner image is again formed on the image formation object for every color, and the toner image and timing on a middle imprint object are doubled, and it is fed, and is a middle imprint object. Pile up the toner image on the image formation object again formed in the front face of the imprint material conveyed as a surface picture, and it is imprinted. Moreover, after carrying out a package imprint at the rear face of imprint material by making the toner image on a middle imprint object into a rear-face picture, it has proposed also about the double-sided color picture formation equipment of the so-called tandem die which separates imprint material from a middle imprint object, is established in the toner image on imprint material, and obtains a double-sided color picture.

[Translation done.]

Drawing selection [Repr sentative drawing]



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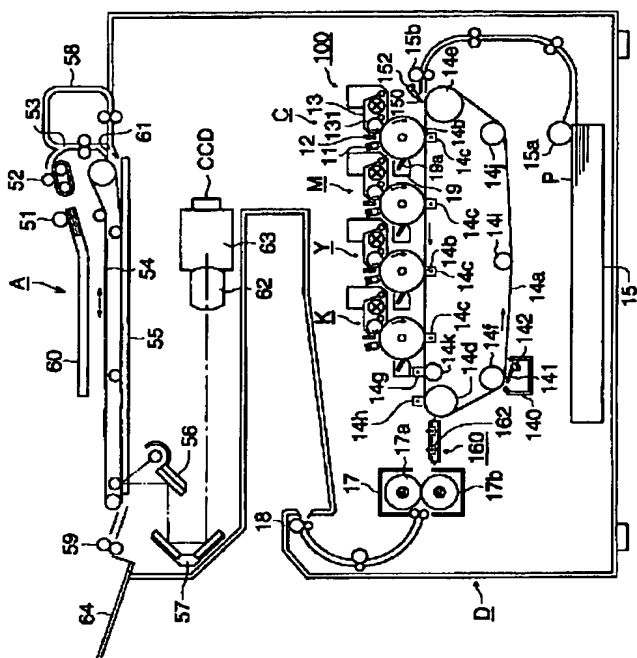
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EFFECT OF THE INVENTION

[Effect of the Invention] When based on this invention, in the tandem-die color picture formation equipment which carries out package fixing of the imprint material which held the color toner image to both sides, the possible color picture formation equipment of obtaining the very good quality of image which does not have a difference in the color tone of the color picture of the front reverse side will be offered. Moreover, when based on a claim 2, since the image formation unit 100 of K is arranged in the style of [of the conveyance direction of toner image television object 14a] the lowest, the effect which carries out print speed at the time of a monochrome black print early produces it.

[Translation done.]

Drawing selection [Representative drawing]



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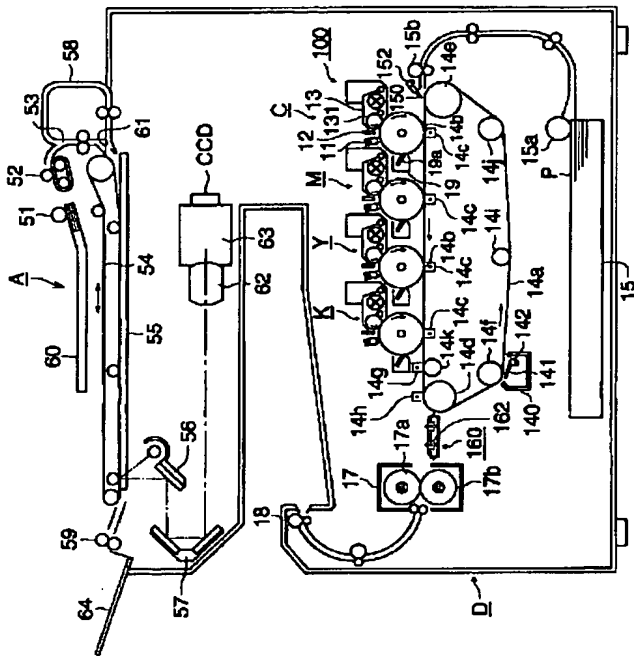
TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the image formation equipment of this tandem die, although there is an advantage that image formation speed becomes early, the toner image formation sequence for every color was decided uniformly, and it cannot change. Therefore, it piled up, and by the surface picture and rear-face picture of a toner image, the order of a pile was reversed and, for this reason, the surface picture and the rear-face picture had the trouble imprinted by imprint material that the color tone of a color picture will be different.

[0006] this invention solves the above-mentioned trouble and it aims at offering the color picture formation equipment which can acquire the picture of the good quality of image which does not have a difference in the color tone of the color picture of the front reverse side.

[Translation done.]

Drawing selection [Representative drawing] 



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MEANS

[Means for Solving the Problem] In the color picture formation equipment which is made to pile up each other's toner image formed on the image formation object one by one, and forms a color picture, while the above-mentioned purpose forms a toner image in both sides of imprint material through a middle imprint object The order of superposition of the color toner image which consists of yellow, a Magenta, cyanogen, and black is attained for the beginning and the last by cyanogen, black, and the color picture formation equipment with which the meantime is characterized by being yellow and a Magenta.

[0008] In addition, the aforementioned color picture formation equipment characterized by the toner image of the aforementioned last being black. Moreover, it is the aforementioned color picture formation equipment characterized by changing the color correction by whether the aforementioned toner image is a surface picture or it is a rear-face picture. Furthermore, the aforementioned color picture formation equipment characterized by making toner coating weight in case the toner image of the aforementioned black becomes a lower layer into size compared with toner coating weight in case the toner image of the aforementioned black becomes the upper layer is a desirable embodiment.

[0009]

[Embodiments of the Invention] The color picture formation equipment which was made to be fixed to both sides which are examples of the gestalt of operation of this invention by forming a color picture is explained. In addition, explanation of the gestalt of operation of the following this inventions does not show the best mode, and limits neither the technical range of a claim, nor a terminological meaning. Moreover, in explanation of the following operation gestalten, the field of the imprint material of the side which counters a front face and the field of another side of imprint material, i.e., a middle imprint object, in the field of the imprint material of the side which counters an image formation object in an imprint region is called rear face, and the picture which imprints the picture imprinted on the front face of imprint material at the rear face of a surface picture and imprint material is called rear-face picture.

[0010] The composition and the operation of color picture formation equipment of 1 operation gestalt in connection with this invention are explained using drawing 1 and drawing 2 . Drawing 1 is the cross-section block diagram of the color picture formation equipment in which 1 operation gestalt of the color picture formation equipment in connection with this invention is shown. drawing 2 It is drawing showing the toner image formation state of both sides of the color picture formation equipment in connection with this invention. drawing 2 (A) Drawing where drawing which imprints the toner image formed in the image formation object on a middle imprint object, and forms a rear-face picture, and drawing 2 (B) form a surface picture in an image formation object synchronizing with the rear-face picture on a middle imprint object, and drawing 2 (C) are drawings showing the double-sided image formation to an imprint material top.

[0011] In drawing 1 , the color picture formation equipment shown with this operation gestalt

consists of picture read station A, the image-data-processing section B (illustration ellipsis), and the image formation section D, the image-data-processing section B is equivalent to an image-processing means, and the aforementioned image formation section D is equivalent to an image formation means for the aforementioned picture read station A at a picture read means.

[0012] Picture read station A makes possible picture read recorded on both sides or one side (front face) of a manuscript, in picture read station A, the laminating of the manuscript 60 is carried out to the order of a page from the bottom by making a front face into facing up, it sells with the taking-out roller 51, and one manuscript 60 of the best layer is conveyed at a time towards the conveyance way 53 one by one by the operation of a roller 52.

[0013] It is made to evacuate to the position which eliminates the guide plate 61 energized by the position shown as a solid line, and is shown with a dashed line, and paper is fed to the taken-out manuscript 60 on the platen glass 55 of the transparent body through the conveyance belt 54, and it stops to a manuscript reading station in the state where the front face was placed upside down. A guide plate 61 returns to the position immediately shown as a solid line after a manuscript's 60 passing.

[0014] The surface picture of the manuscript 60 on platen glass 55 The 1st mirror unit 56 which consists of a lighting lamp which constitutes scanning optical system, and the 1st mirror, Reading operation by the speed V of the 1st mirror unit 56 of the 2nd mirror unit 57 which consists of the 2nd mirror located in the shape of V character, and the 3rd mirror, It is read by movement by speed $V / 2$ to this direction by the 2nd mirror unit 57, and image formation is carried out to the light-receiving side of the image pck-up element CCD which are three line sensors through the projection lens 62 and a dichroic prism 63. Photo electric translation of the optical image of the shape of a line which carried out color separation and which carried out image formation on the image pck-up element CCD is carried out to an electrical signal (luminance signal) one by one.

[0015] At picture read station A, after reading of a surface picture is completed, a manuscript 60 reverses the front reverse side through the reversal feeding way 58 by temporary inverse rotation of the conveyance belt 54, and paper is again fed to it on platen glass 55 through the conveyance belt 54 through the conveyance way 53, and it stops to a manuscript reading station in the state where the rear face was placed upside down.

[0016] With the aforementioned scanning optical system, the manuscript 60 on platen glass 55 is read, carries out color separation of the rear-face picture, and photo electric translation is carried out to an electrical signal by the image pck-up element CCD.

[0017] Paper is delivered to the manuscript 60 which ended reading of the picture on platen glass 55 so that a front face may be piled up in order of [bottom] a page in the upward state on a tray 64 through the delivery roller 59 by operation of the conveyance belt 54.

[0018] In the image-data-processing section B mentioned later, the picture signal (image data) of the manuscript picture read by the aforementioned picture read station A is outputted to the image formation section D, after various image processings, such as concentration conversion, filtering, variable power processing, gamma amendment, and amendment processing of a table / back picture, are performed.

[0019] The photo conductor drum whose 10 is an image formation object for every color in the image formation section D, The scorotron electrification machine whose 11 is an electrification means for every color, the exposure optical system whose 12 is a picture write-in means for every color, The development counter whose 13 is a development means for every color, the toner image television object whose 14a is a middle imprint object, The imprint machine whose 14c is an imprint means for every color, the rear-face imprint machine whose 14g is a rear-face picture imprint means, The paper separation AC electric discharge machine whose 14h is an imprint material separation means, the timing roller whose 15b is an imprint material supply means, The paper electrification machine whose 150 is an imprint material electrification means, the conveyance section which is a conveyance means by which 160 has a spur 162, The fixing

equipment whose 17 is a fixing means, the cleaning equipment whose 19 is an image formation object cleaning means for every color, and 140 are toner image television object cleaning equipment which is middle imprint object cleaning meanses.

[0020] In this operation gestalt the photo conductor drum 10 for every color, the scorotron electrification machine 11 for every color, the exposure optical system 12 for every color, and the development counter 13 for every color The image formation unit 100 is constituted as these 1 sets. Cyanogen (C), A Magenta (M), yellow (Y), and 4 sets of image formation units 100 for every black (K) color are formed, and it is arranged in order of C, M, Y, and K according to the color and sequence which are formed to the hand of cut of toner image television object 14a which rotates to the counterclockwise rotation shown by the arrow of drawing 1 . However, C, Y, M, K, and the beginnings, such as K, Y, M, C, or K, M, Y, C, and the last other than the above [this order of an array] should just be [cyanogen (C) black (K) and the meantime] yellow (Y) and a Magenta (M).

[0021] The photo conductor drum 10 which is an image formation object forms photosensitive layers, such as a conductive layer, an a-Si layer, or an organic photosensitive layer (OPC), in the periphery of the metal base of the shape of a cylinder formed for example, of aluminum material, and rotates to the clockwise rotation shown by the arrow of drawing 1 where a conductive layer is grounded.

[0022] By the control grid held at predetermined potential, respectively, the toner by the corona discharge electrode, and the corona discharge of like-pole nature, the scorotron electrification machine 11 which is an electrification means for every color performs an electrification operation (it sets in this operation form and is minus electrification), and gives uniform potential to the photo conductor drum 10. As a corona discharge electrode of the scorotron electrification machine 11, it is also possible to, use a serrate electrode and a needlelike electrode in addition to this.

[0023] The exposure optical system 12 which is a picture write-in means for every color is arranged around the photo conductor drum 10, as the exposure position on the photo conductor drum 10 is located in the hand-of-cut downstream of the photo conductor drum 10 to the scorotron electrification machine 11 for every color mentioned above. The exposure optical system 12 for every color is a unit for exposure which consists of optical convergency optical-transmission objects (tradename : selfoc-lens array) as the exposure element and image formation element of the line which arranged two or more Light Emitting Diodes (light emitting diode) as the drum shaft of the photo conductor drum 10, and a light emitting device of the image exposure light (picture write-in light) arranged by parallel at main scanning direction in the shape of an array. As exposure optical system 12, it is also possible to, use a laser beam study system in addition to this. The exposure optical system 12 for every color carries out image exposure of the photosensitive layer of the photo conductor drum 10 according to the image data of each color which was read by picture read station A and memorized by memory, and forms an electrostatic latent image on the photo conductor drum 10 for every color.

[0024] The development counter 13 which is a development means for every color maintains a predetermined gap to the peripheral surface of the photo conductor drum 10. The thickness of 0.5-1mm rotated to the hand of cut and the forward direction of the photo conductor drum 10, It had the development sleeve 131 formed by the nonmagnetic stainless steel or the nonmagnetic aluminum material of the shape of a cylinder with an outer diameter of 15-25mm, and the developer of cyanogen (C), yellow (Y), a Magenta (M) and one black (K) component, or two components is held in the interior according to the development color for every color. Un-illustrating dashes the development sleeve 131 of each development counter 13, it opens the photo conductor drum 10 and a predetermined gap, for example, 100-500 micrometers, by KORO, is maintained at non-contact, by impressing the development bias voltage which superimposed direct current voltage and alternating voltage to the development sleeve 131, performs contact or non-contact reversal development, and develops the aforementioned

electrostatic latent image on the photo conductor drum 10 in a toner image.

[0025] A volume resistivity toner image television object 14a which is a middle imprint object 1012 – 1015 ohm-cm, Surface electrical resistance is the endless belt of the 1012 – 1015 ohm/cm². For example, a denaturation polyimide, A thermosetting polyimide, an ethylene tetrafluoroethylene copolymer, a polyvinylidene fluoride, Distributed the electrical conducting material to engineering plastics, such as a nylon alloy. It is the seamless belt of the two-layer composition which performed fluorine coating with a thickness of 5–50 micrometers on the outside of a half-conductivity film base with a thickness of 0.1–1.0mm as a toner filming prevention layer preferably. If it considers as the base of toner image television object 14a, a half-conductivity rubber belt with a thickness of 0.5–2.0mm which distributed the electrical conducting material can also be used for silicone rubber or polyurethane rubber.

[0026] Toner image television object 14a is inscribed in and laid [firmly] across drive roller 14d and follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and tension roller 14i, and rotates to the counterclockwise rotation shown by the arrow of drawing 1. According to the hand of cut of toner image television object 14a, it is prepared in order of follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d, guide-idler 14f, tension roller 14i, and guide-idler 14j, and it can fix and rotate and tension roller 14i can move follower roller 14e, rear-face imprint opposite roller 14k, and drive roller 14d and guide idlers 14f and 14j during rotation by the elasticity of toner image television object 14a.

[0027] If drive roller 14d rotates in response to a drive [drive motor / non-illustrated], drive rotation of the toner image television object 14a will be carried out. Follower rotation of follower roller 14e, guide idlers 14f and 14j, rear-face imprint opposite roller 14k, and the tension roller 14i is carried out by rotation of toner image television object 14a. The belt slack of toner image television object 14a under rotation becomes it tense by tension roller 14i.

[0028] On both sides of toner image television object 14a, imprint machine 14c which is an imprint means for every color counters with the photo conductor drum 10 for every color, is prepared, and forms imprint region 14b for every color between toner image television object 14a and the photo conductor drum 10 for every color. Polar (it sets in this operation gestalt and is plus polarity) direct current voltage opposite to a toner is impressed to imprint machine 14c for every color, and the toner image on the photo conductor drum 10 for every color is imprinted by forming imprint electric field in imprint region 14b on a toner image television object 14a top or the front face of imprint material.

[0029] Moreover, it is prepared in conductive rear-face imprint opposite roller 14k grounded on both sides of toner image television object 14a face to face, polar (it sets in this operation gestalt and it is plus polarity) direct current voltage opposite to a toner is impressed, and 14g of rear-face imprint machines which are a rear-face picture imprint means bundles up the superposition color toner image supported on toner image television object 14a, and they imprint it at the rear face of imprint material.

[0030] Drive roller 14d is countered, 14h of paper separation AC electric discharge machines which are an imprint separation means counters with guide-idler 14f again, and the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means is formed.

[0031] The paper electrification machine 150 which is an imprint material electrification means is countered and formed in follower roller 14e grounded on both sides of toner image television object 14a, contact and contact release are possible for it to toner image television object 14a, is charged in imprint material, and is made to stick to toner image television object 14a by using a pivot 152 as the rotation supporting point. In addition, the paper electrification machine 150 may be a corona discharge machine estranged and formed.

[0032] Conductive drive roller 14d grounded by the fixing equipment 17 side-edge section of toner image television object 14a on both sides of toner image television object 14a together with 14g of rear-face imprint machines if needed is countered, it is prepared, the alternating

voltage which superimposed the direct current voltage of a toner, like-pole nature, or reversed polarity is impressed, and 14h of paper separation AC electric-discharge machines discharges the imprint material conveyed by toner image television object 14a. Separation from toner image television object 14a of imprint material is performed to curvature separation of drive roller 14d, or curvature separation of drive roller 14d by using together an electric discharge operation of 14h of paper separation AC electric discharge machines.

[0033] The conveyance section 160 is formed between toner image television object 14a and fixing equipment 17, and a spur 162 is formed in the upper surface of the conveyance section 160. A spur 162 conveys the imprint material which has a toner image at the rear face to fixing equipment 17, preventing disorder of a rear-face toner image while dipping up the imprint material which is going to be conveyed by bending in the direction of toner image television object 14a, in case imprint material is separated from toner image television object 14a.

[0034] Fixing equipment 17 consists of two rollers of fixing roller 17a and sticking-by-pressure roller 17b which have a heater inside, and is established in the toner image on imprint material by applying heat and a pressure between fixing roller 17a and sticking-by-pressure roller 17b.

[0035] On both sides of toner image television object 14a, the toner image television object cleaning equipment 140 which is a middle imprint object cleaning means counters guide-idler 14f by the side of fixing equipment 17, is formed, and cleans the transfer residual toner on toner image television object 14a to toner image television object 14a by using a pivot 142 as the rotation supporting point by the toner image television object cleaning blade 141 in which contact and contact release are possible. It counters with guide-idler 14j by the side of penetration of imprint material, and toner image television object cleaning equipment 140 can also be prepared.

[0036] Next, a double-sided image formation process is explained. If the start of image recording is made, in picture read station A, the image data of the manuscript picture read by the image pick-up element or the image data of the picture edited by computer will be processed in the image-data-processing section B explained later as a picture signal according to each color of C (cyanogen), M (Magenta), Y (yellow), and K (black).

[0037] It rotates to the clockwise rotation which the photo conductor drum 10 of the image formation unit 100 of cyanogen (C) shows by the arrow of drawing 1 by starting of the photo conductor drive motor which is not illustrated by the start of image recording, and grant of potential is simultaneously started by the photo conductor drum 10 of C by electrification operation of the scorotron electrification machine 11 of C.

[0038] After potential is given to the photo conductor drum 10 of C, the picture writing (exposure) by the 1st chrominance signal about a rear-face picture, i.e., the electrical signal corresponding to the image data of C, is started by the exposure optical system 12 of C, and the electrostatic latent image corresponding to the picture of C of a manuscript picture is formed in the photosensitive layer of the front face of the photo conductor drum 10 of C.

[0039] Reversal development of the aforementioned latent image is carried out in the state of [non-contact] contact by the development counter 13 of C, and the toner image of cyanogen (C) is formed according to the rotation on the photo conductor drum 10 of C.

[0040] The toner image of C used as the rear-face picture formed on the photo conductor drum 10 of C of the above-mentioned image formation process is imprinted by imprint machine 14c of C on toner image television object 14a in imprint region 14b of C.

[0041] Subsequently, the photo conductor drum 10 of M of the image formation unit 100 of a Magenta (M) Potential is given by electrification operation of the scorotron electrification machine 11 of M, and the toner image of C on toner image television object 14a and a synchronization are taken. The picture writing (exposure) by the 2nd chrominance signal, i.e., the electrical signal corresponding to the image data of M, is performed by the exposure optical system 12 of M, and the toner image of the Magenta (M) which serves as a rear-face picture by the contact or the non-contact reversal development by the development counter 13 of M is

formed. The toner image of this M is imprinted by imprint machine 14c of M on toner image television object 14a in imprint region 14b of M, and the toner image of the upper shell M of the toner image of the aforementioned cyanogen (C) piles up, and is formed.

[0042] According to the same process, the superposition toner image of Above C and M and a synchronization are taken. The toner image of Y used as the rear-face picture corresponding to the image data of Y by the 3rd chrominance signal formed on the photo conductor drum 10 of Y of the image formation unit 100 of yellow (Y) sets to imprint region 14b of Y. Of imprint machine 14c of Y, the toner image of the upper shell Y of the superposition toner image of Above C and M piles up, and is formed. Furthermore, the toner image of K used as the rear-face picture corresponding to the image data of K by the 4th chrominance signal which the superposition toner image of C, M, and Y and synchronization were taken, and was formed on the photo conductor drum 10 of K of the black (K) image formation unit 100. In imprint region 14b of K, of imprint machine 14c of K, the toner image of the upper shell K of the toner image of Above C, M, and Y piles up, and is formed, and the superposition color toner image of four colors of C, M, Y, and K of a rear-face picture is formed on toner image television object 14a (drawing 2 (A)).

[0043] The toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint results in the cleaning equipment 19 which is a photo conductor drum cleaning means, and is cleaned by cleaning-blade 19a which consists of the rubber material which contacted the photo conductor drum 10.

[0044] After the piled-up color toner image which turns into a rear-face picture on toner image television object 14a as mentioned above is formed, the synchronization with the color toner image of the rear-face picture currently succeedingly supported by toner image television object 14a is taken, and the toner image of C which turns into a surface picture of C by the image formation unit 100 of C is formed on the photo conductor drum 10 of C like the aforementioned color picture formation process. Under the present circumstances, image data is changed so that the surface picture of C formed on the photo conductor drum 10 of C may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C.

[0045] In connection with the surface image formation of C to the photo conductor drum 10 top of C, from the feed cassette 15 whose recording paper P which is imprint material is an imprint material receipt means. It is sent out by send roller 15a and conveyed to timing roller 15b as an imprint material feed means. by the drive of timing roller 15b The synchronization with the toner image of the surface picture of C supported on the photo conductor drum 10 of C and the color toner image of the rear-face picture currently supported by toner image television object 14a is taken, and imprint region 14b of C is fed. Under the present circumstances, paper electrification of the recording paper P is carried out at a toner and like-pole nature, toner image television object 14a is adsorbed by the brush-like paper electrification machine 150, and the nose of cam where it is considered as the contact state and the direct current voltage of a toner and like-pole nature (it sets in this operation form and is minus polarity) was impressed to the recording paper P is conveyed with it to imprint region 14b of C (drawing 2 (B)). By performing paper electrification to a toner and like-pole nature, it prevented paying well with the toner image on toner image television object 14a, or the toner image on the photo conductor drum 10 of C, and disorder of a toner image is prevented. Instead of the brush-like paper electrification machine 150, you may use a corona-electrical-charging machine.

[0046] In imprint region 14b of C, the surface picture on the photo conductor drum 10 of C is imprinted by imprint machine 14c of C to which polar (it sets in this operation form and is plus polarity) voltage opposite to a toner was impressed on the front face of the recording paper P. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting.

[0047] Similarly the synchronization with the color toner image of a rear-face picture and the toner image of the surface picture of C which are supported by toner image television object

14a is taken. The toner image of the surface picture of M, Y, and K is formed on the photo conductor drum 10 of each image formation unit 100. M, Y, and K -- the toner image of the surface picture of M, Y, and K -- each imprint region 14b -- a toner and opposite polarity (in this operation form) The color toner image of the surface picture of M, Y, and K on each photo conductor drum 10 is imprinted one by one on the front face of the recording paper P in order of M, Y, and K by each imprint machine 14c to which the voltage of ** plus polarity was impressed at the toner image top of C. At this time, the rear-face picture on toner image television object 14a exists on toner image television object 14a without the recording paper's P imprinting. Image data is changed so that the surface picture of C, M, Y, and K which are formed on the photo conductor drum 10 of C, M, Y, and K may turn into a mirror image to the rear-face picture formed on the photo conductor drum 10 of Above C, M, Y, and K, respectively.

[0048] The recording paper P with which the color toner image was imprinted by the front face is conveyed at 14g of rear-face imprint machines which impressed polar (it sets in this operation form and is plus polarity) voltage opposite to a toner, and the color toner image of the rear-face picture on the peripheral surface of toner image television object 14a bundles it up with 14vessels of rear-face imprint machines, and it is imprinted by the rear face of the recording paper P.

[0049] Moreover, simultaneously with passage just before passage of the back end of the recording paper P, from toner image television object 14a, contact release is carried out and the paper electrification machine 150 is estranged with the recording paper P (drawing 2 (C)). Impression of the voltage to the paper electrification machine 15 is only a time of the recording paper P being sent, and the voltage currently impressed simultaneously with alienation with the recording paper P to the paper electrification machine 150 is disconnected.

[0050] The electric-discharge operation of 14h of paper separation AC electric-discharge machines as an imprint material separation means performed by next using together with curvature separation drive roller 14d if needed [curvature separation or if needed] dissociates from toner image television object 14a, and the recording paper P with which the color toner image was imprinted by both sides is conveyed through the conveyance section 160 in which the spur 162 was formed to fixing equipment 17. ***** to which the recording paper P applies heat and a pressure in fixing equipment 17 between fixing roller 17a and sticking-by-pressure roller 17b -- things are fixed to the toner image on the rear face of front of the recording paper P, the picture of the front reverse side is reversed and sent and the recording paper P with which double-sided image recording was made is discharged with the delivery roller 18 to the tray of the equipment exterior

[0051] The toner which remained on the peripheral surface of toner image television object 14a after an imprint uses as the rotation supporting point the pivot 142 which countered guide-idler 14f and was prepared on both sides of toner image television object 14a, and the contact and the contact release to toner image television object 14 a are possible for it, and it is cleaned by the toner image television object cleaning blade 141 of the toner image television object cleaning equipment 140 made into a contact state at toner image television object 14a.

[0052] Moreover, cleaning-blade 19a of cleaning equipment 19 removes a remains toner, the history on the photo conductor drum 10 by previous image formation is canceled by the uniform photographic filter before non-illustrated electrification, and the toner which remained on the peripheral surface of the photo conductor drum 10 for every color after an imprint is in the following image formation cycle.

[0053] Of course, also do single-sided image formation which forms a picture in one side of only the front face of imprint material, or a rear face other than the double-sided image formation which forms a picture in both sides of imprint material which was explained with the above-mentioned operation form with above double-sided image formation equipment.

[0054] Here, the circuitry of the above color picture formation equipment which consists of

aforementioned picture read station A, the image-data-processing section B, and the image formation section D is explained according to the block diagram of drawing 3 and drawing 4 .

[0055] First, in picture read station A, the analog picture signal of three colors which are outputted from the aforementioned image pick-up element CCD and which carried out color separation is changed into a digital image signal (image data) by A/D converter B11, and is outputted to the image-data-processing section B through an interface B12.

[0056] The digital image signal (luminance signal) inputted into the image-data-processing section B is first changed into concentration information by the concentration conversion B13.

[0057] And variable power processing according to variable power specification of a user is performed by the enlarging-or-contracting processing B14. Moreover, in the picture distinction processing B15, character drawing and photograph drawing are distinguished based on the concentration information changed by the aforementioned concentration conversion B13, the filter shape in filtering B16 is set up based on this distinction result, and spatial filter processing is performed by filtering B16 according to the aforementioned setup.

[0058] In addition, the aforementioned picture distinction processing B15 shall be equivalent to the picture distinction means and processing property adjustable means in this operation form, and distinction of character drawing and photograph drawing shall include distinction of the character picture field in the mixture picture of character drawing and photograph drawing, and a photograph field.

[0059] Here, in order to replace filtering and variable power processing and to make them perform according to specification of enlarging or contracting, the data selectors B17 and B18 of a couple are formed. The exchange with the aforementioned filtering and variable power processing is performed in order to prevent the moire of the half-tone-dot drawing looked at by the picture at the time of reduction processing.

[0060] On the other hand, the EE processing B19 obtains histogram data, in order to acquire the feature of a manuscript picture from the image information obtained by the preece can in front of this scan. And CPU of the image-processing system which is not illustrated provides gamma amendment processing B20 with proper gamma amendment data based on the aforementioned histogram data.

[0061] The image data (concentration information) to which filtering and variable power processing were performed is outputted to the picture field processing B21, after gamma amendment according to the property of the image formation equipment B25 later mentioned by the aforementioned gamma amendment processing B20 is given. the aforementioned picture field processing B21 -- others [extraction / of the effective picture field of a manuscript] -- ****(ing) -- *****(ing) -- etc. -- field processing is also performed

[0062] The image data (concentration information) which changed into the final output state to the image formation equipment B25 which all image processings required for image formation are performed as mentioned above, and is mentioned later is outputted to the image formation section D through an interface B22.

[0063] In the image formation section D, with the function to carry out image formation to the photo conductor drum 10 top to real time to the read of a manuscript The data selector B91 which reads the image data which carries out two or more storage maintenance of the inputted image data in the picture storage section B23, and was this memorized afterwards to arbitration, It has the picture amendment processing B92 in which picture amendment is performed corresponding to a table/reverse side, and the function to make image formation perform from the amended image data.

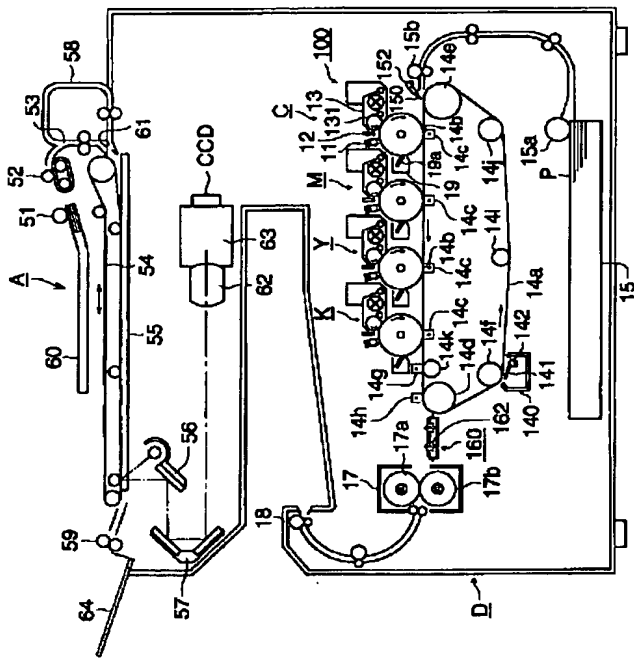
[0064] Here, with this operation form, the function to read alternatively from after the image data which a manuscript picture is read as mentioned above, it is obtained, and ** also saves the image data to which all required image processings were performed, and was this saved, and to make image formation perform shall be called an electronic RDH function.

[0065] The picture storage section B23 memorized possible [rewriting of image data] in it in

order to realize the aforementioned electronic RDH function other than the image formation equipment B25 which is a LASER beam printer etc. in the image formation section D

[Translation done.]

Drawing selection [Repr sentativ drawing]



[Translation done.]

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JAPANESE [JP,2002-031933,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the cross-section block diagram showing an example of the image formation equipment of this invention.

[Drawing 2] It is explanatory drawing showing supply of a toner image formation state and imprint material.

[Drawing 3] It is the block diagram showing an example of a circuit used for this invention.

[Drawing 4] It is the block diagram showing the detail of picture amendment processing of drawing 3 .

[Drawing 5] It is explanatory drawing showing the stacking order of each color toner in the front reverse side of imprint material.

[Drawing 6] It is the graph which shows the spectral-reflectance curve of each color toner used.

[Drawing 7] It is the graph which shows the spectral-reflectance curve of each ideal color toner.

[Description of Notations]

- 10 Photo Conductor Drum (Image Formation Object)
- 11 Scorotron Electrification Machine
- 12 Exposure Optical System
- 13 Development Counter
- 14a Toner image television object (middle imprint object)
- 14c Imprint machine
- 14g Rear-face imprint machine
- 14h Paper separation AC electric discharge machine
- 17 Fixing Equipment
- A Picture read station
- B Image-data-processing section
- D Image formation section
- P Recording paper (imprint material)

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JAPANESE

[JP,2002-031933,A]

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INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

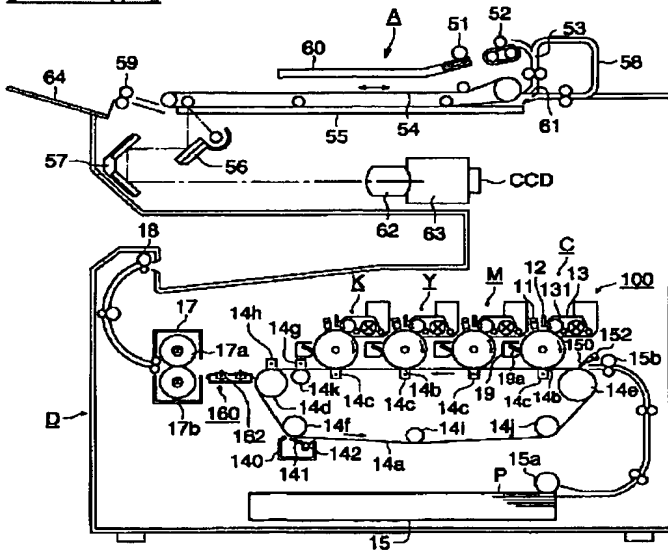
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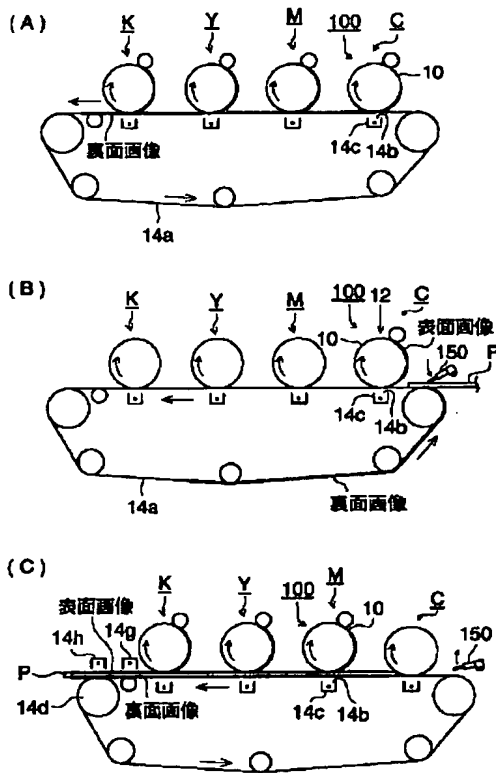
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DRAWINGS

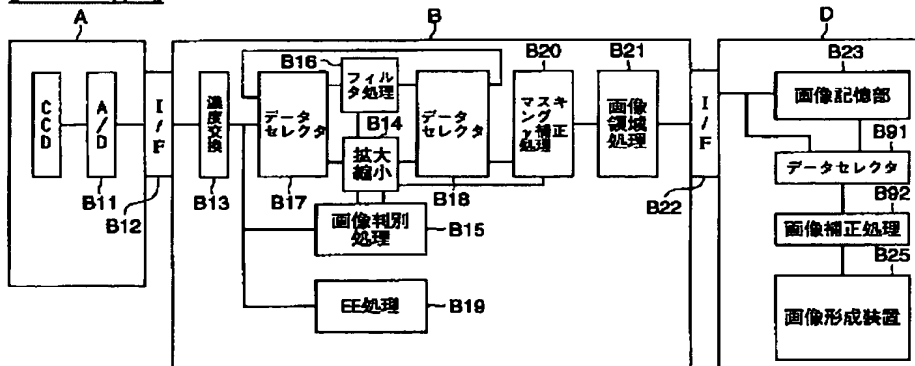
[Drawing 1]



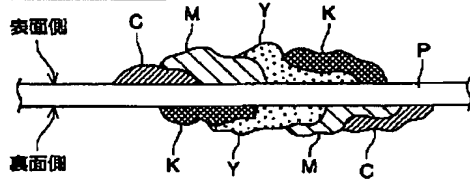
[Drawing 2]



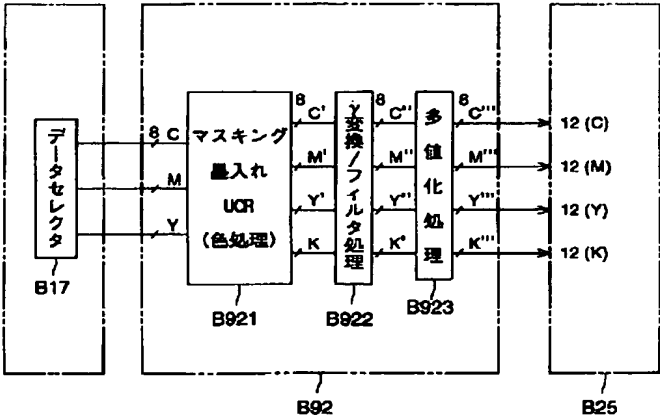
[Drawing 3]



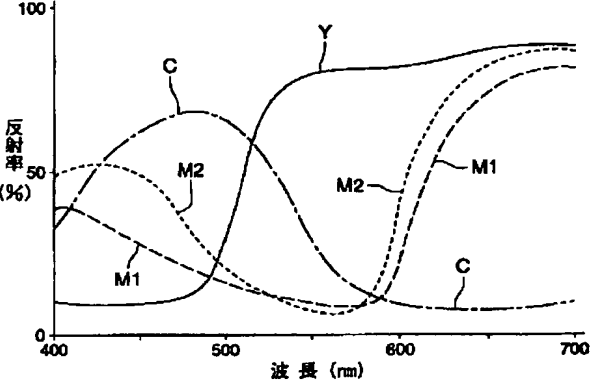
[Drawing 5]



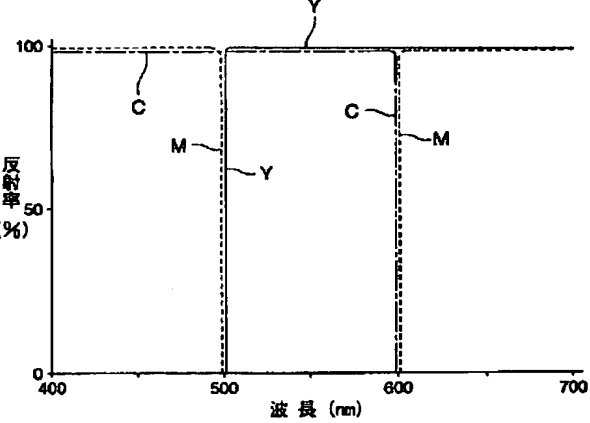
[Drawing 4]



[Drawing 6]

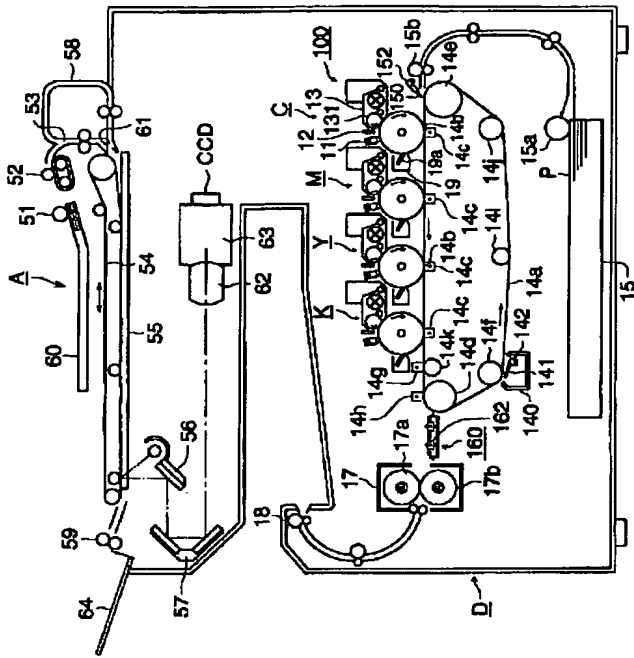


[Drawing 7]



[Translation done.]

Drawing selection [R presentativ drawing] 



[Translation done.]

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